Industrial Ethernet Switch Card

ICS-4040 User's Manual

Version 1.0

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Getting to Know Your Switch Card

1.1 About the ICS-4040

The ICS-4040 is a cost-effect and powerful industrial switch card. The card has many functions, and it can work under high temperature and dusty environment.

The ICS-4040 can be managed by WEB. Besides, ICS-4040 can be managed by a useful utility that we called Open-Vision. Open-Vision is powerful network management software. With its friendly and powerful interface, you can easily configure multiple switches at the same time, and monitor switches' status.

1.2 Software Features

- PCI Local Bus specification, Rev 2.2
- World's fastest Redundant Ethernet Ring (Recovery time < 10ms over 250 units connection)
- Support 5 modes: Network Device redundant; Device comm..; Network; RSTP switch and switch modes.
- Relay output for power failure (Optional)
- Easy-to-configure: Web / Windows utility
- Windows utility (Open-Vision) for network management

1.3 Hardware Features

- Redundant three DC power inputs (PCI power and external power on terminal block)
- Operating Temperature: -40 to 70^{o}C
- Storage Temperature: -40 to 85^{o}C
- Operating Humidity: 5% to 95%, non-condensing
- 10/100Base-T(X) Ethernet port

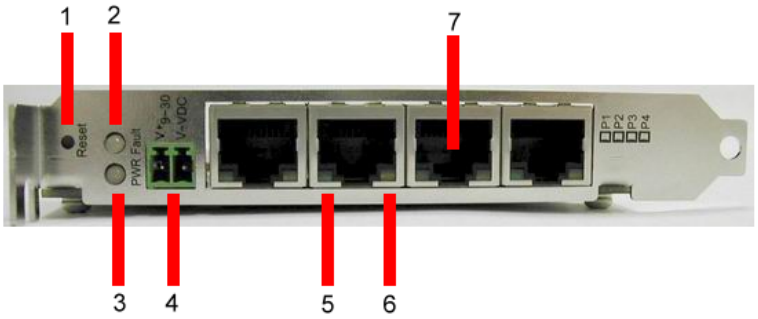
Hardware Overview

2.1 Front Panel

The following table describes the labels on the front panel of ICS-4040:

Port	Description
10/100 RJ-45 fast Ethernet ports	4 10/100Base-T(X) RJ-45 fast Ethernet ports support auto-negotiation. Default Setting : Speed: auto Duplex: auto Flow control : disable
External Power Input	External power input with DC 9~30V.
Reset	Push reset button 2 to 3 seconds to reset the switch. Push reset button 5 second to reset the switch into **Factory Default.**

ICS-4040



1. Reset button. Push the button 3 seconds for reset; 5 seconds for factory default.
2. LED for Fault Relay. When the fault occurs, the amber LED will be light on.
3. LED for Power. When the PCI power on, the green led will be light on. When PCI power off and External Power on, the red led will be light on.
4. External power input with DC 9~30V.
5. LED for Ethernet ports link/act status.
6. LED for Ring ports setting.
7. 10/100Base-T(X) Ethernet ports.

2.2 Front Panel LEDs

LED	Color	Status	Description
PWR	Green	On	Power of PCI interface or external power on
Fault	Amber	On	Fault indicator. Power failure or Port down/fail.
Ethernet	Green	On	Ethernet Link/act LED
Ring	Amber	On	– Ring mode "Ring port" –Fast Recovery "Act port"

2.3 DIP Switch

ICS-4040 can control redundancy mode by hardware. The following table shows dip switch on/off status and redundancy mode.

DIP SW	1	2
Ring	On	On
Redundant (fast recovery mode)	On	Off
RSTP	Off	On
Normal	Off	Off

Note: Redundancy mode controlled by hardware, all parameters will be set to default value:

The Ring will set P1 P2 to be the 1st ring port and the 2nd ring port.

The Redundant mode will set P1 ~ P4 to the 4 priorities.

Cables

3.1 Ethernet Cables

The ICS-4040 has standard Ethernet ports. According to the link type, the switches use CAT 3, 4, 5,5e UTP cables to connect to any other network device (PCs, servers, switches, routers, or hubs). Please refer to the following table for cable specifications.

Cable Types and Specifications

Cable	Type	Max. Length	Connector
10BASE-T	Cat. 3, 4, 5 100-ohm	UTP 100 m (328 ft)	RJ-45
100BASE-TX	Cat. 5 100-ohm UTP	UTP 100 m (328 ft)	RJ-45

3.1.1 100BASE-TX/10BASE-T Pin Assignments

With 100BASE-TX/10BASE-T cable, pins 1 and 2 are used for transmitting data, and pins 3 and 6 are used for receiving data.

RJ-45 Pin Assignments

Pin Number	Assignment
1	TD+
2	TD-
3	RD+
4	Not used
5	Not used
6	RD-
7	Not used
8	Not used

The ICS-4040 supports auto MDI/MDI-X operation. You can use a straight-through cable to connect PC to switch. The following table below shows the 10BASE-T/ 100BASE-TX MDI and MDI-X port pin outs.

MDI/MDI-X pins assignment

Pin Number	MDI port	MDI-X port
1	TD+(transmit)	RD+(receive)
2	TD-(transmit)	RD-(receive)
3	RD+(receive)	TD+(transmit)
4	Not used	Not used
5	Not used	Not used
6	RD-(receive)	TD-(transmit)
7	Not used	Not used
8	Not used	Not used

Note: "+" and "-" signs represent the polarity of the wires that make up each wire pair.

WEB Management

4.1 Configuration by Web Browser

This section introduces the configuration by Web browser.

4.1.1 About Web-based Management

Inside the CPU board of the card, an embedded HTML website resides in flash memory. It contains advanced management features and allows you to manage the switch from anywhere on the network through a standard browser such as Microsoft Internet Explorer.

The Web-Based Management supports Internet Explorer 5.0. It is based on Java Applets with an aim to reduce network bandwidth consumption, enhance access speed and present an easy viewing screen.

Note: By default, IE5.0 or later version does not allow Java Applets to open sockets. You need to explicitly modify the browser setting in order to enable Java Applets to use network ports.

Preparing for Web Management

The default value is as below:

IP Address: **192.168.10.1**

Subnet Mask: **255.255.255.0**

Default Gateway: **192.168.10.254**

User Name: **admin**

Password: **admin**

System Login

1. Launch the Internet Explorer.
2. Type http:// and the IP address of the switch. Press "**Enter**".

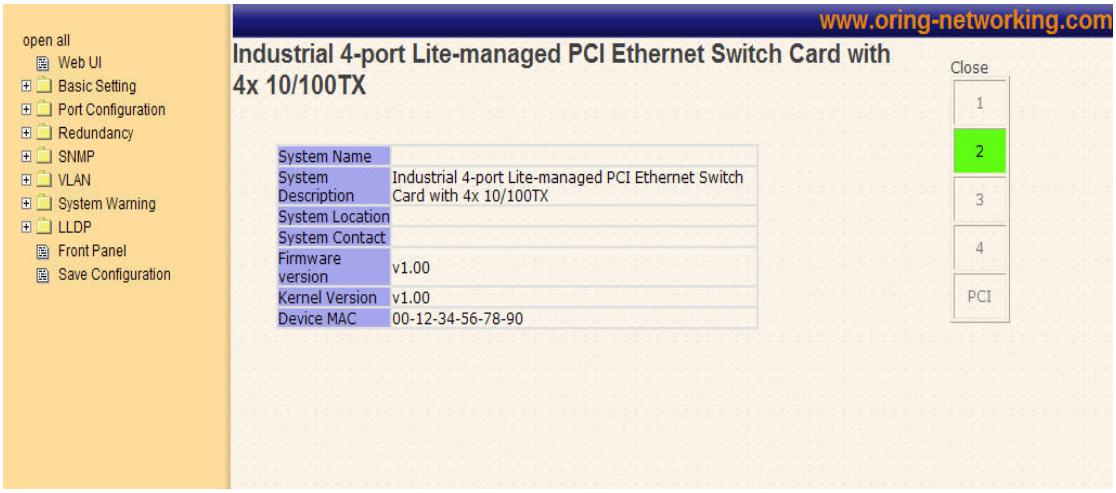
3. The login screen appears.
4. Key in the username and password. The default username and password is

"**admin**".

5. Click "**Enter**" or "**OK**" button, then the main interface of the Web-based management appears.

Login screen

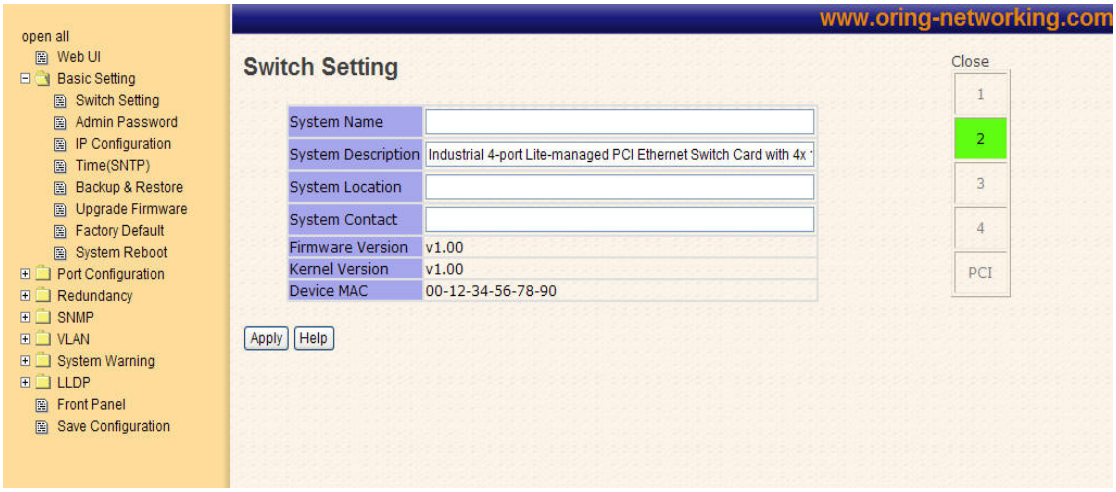
Main Interface



Main interface

4.1.2 Basic Setting

4.1.2.1 Switch setting



Switch setting interface

The following table describes the labels in this screen.

Label	Description
System Name	Assign the name of switch. The maximum length is 64 bytes
System Description	Display the description of switch.
System Location	Assign the switch physical location. The maximum length is 64 bytes
System Contact	Enter the name of contact person or organization
Firmware Version	Display the switch's firmware version
Kernel Version	Display the kernel software version
MAC Address	Display the unique hardware address assigned by manufacturer (default)

4.1.2.2 Admin Password

Change web management login username and password for the management security issue

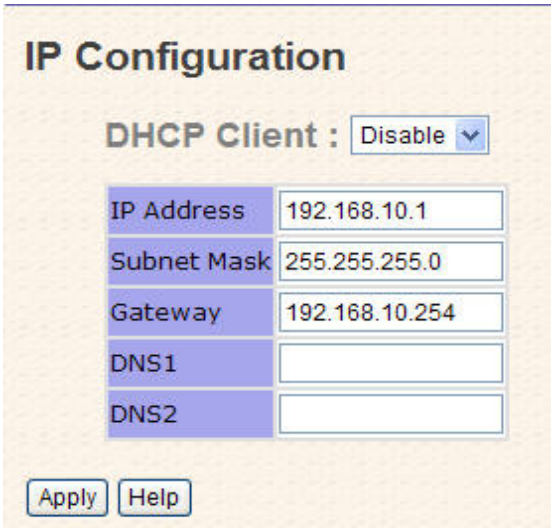
Admin Password interface

The following table describes the labels in this screen.

Label	Description
User name	Key in the new username(The default is "**admin**")
New Password	Key in the new password(The default is "**admin**")
Confirm password	Re-type the new password.
Apply	Click "**Apply**" to set the configurations.

4.1.2.3 IP configuration

You can configure the IP Settings and DHCP client function through IP configuration.



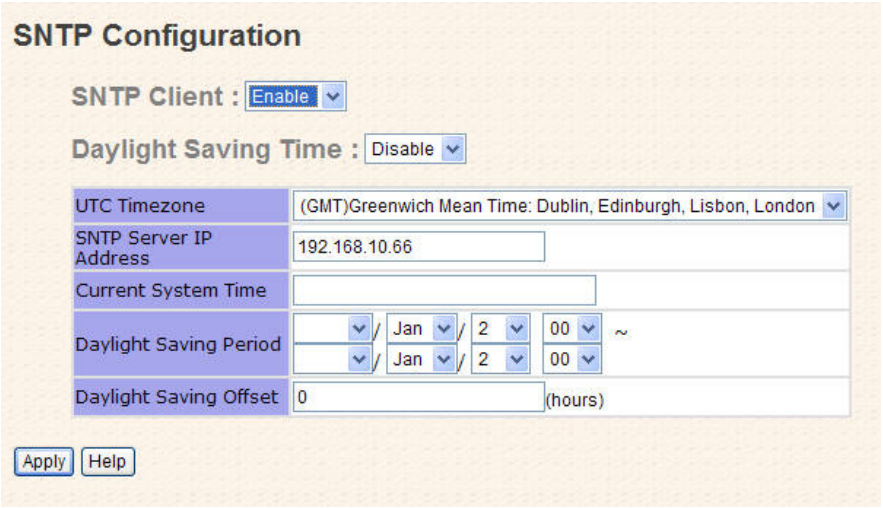
IP Configuration interface

The following table describes the labels in this screen.

Label	Description
DHCP Client	To enable or disable the DHCP client function. When DHCP client function is enabling, the switch will be assigned the IP address from the network DHCP server. The default IP address will be replacee by the IP address which the DHCP server has assigned. After clicking "**Apply**" button, a popup dialog will show up to inform you when the DHCP client is enabling. The current IP will lose and you should find the new IP on the DHCP server.
IP Address	Assign the IP address that the network is using. If DHCP client function is enabling, you do not need to assign the IP address. The network DHCP server will assign the IP address for the switch and it will be displayed in this column. The default IP is 192.168.10.1
Subnet Mask	Assign the subnet mask of the IP address. If DHCP client function is enabling, you do not need to assign the subnet mask
Gateway	Assign the network gateway for the switch. The default gateway is 192.168.10.254
DNS1	Assign the primary DNS IP address
DNS2	Assign the secondary DNS IP address
Apply	Click "**Apply**" to set the configurations.

4.1.2.4 SNTP Configuration

The SNTP (Simple Network Time Protocol) settings allow you to synchronize switch clocks in the Internet.



SNTP Configuration interface

The following table describes the labels in this screen.

Label	Description
SNTP Client	Enable or disable SNTP function to get the time from the SNTP server.
Daylight Saving Time	Enable or disable daylight saving time function. When daylight saving time is enabling, you need to configure the daylight saving time period.
UTC Time zone	Set the switch location time zone. The following table lists the different location time zone for your reference.

Local Time Zone	Conversion from UTC	Time at 12:00 UTC
November Time Zone	- 1 hour	11 am
Oscar Time Zone	-2 hours	10 am
ADT - Atlantic Daylight	-3 hours	9 am
AST - Atlantic Standard EDT - Eastern Daylight	-4 hours	8 am
EST - Eastern Standard CDT - Central Daylight	-5 hours	7 am
CST - Central Standard MDT - Mountain Daylight	-6 hours	6 am
MST - Mountain Standard PDT - Pacific Daylight	-7 hours	5 am
PST - Pacific Standard ADT - Alaskan Daylight	-8 hours	4 am
ALA - Alaskan Standard	-9 hours	3 am
HAW - Hawaiian Standard	-10 hours	2 am
Nome, Alaska	-11 hours	1 am

CET - Central European FWT - French Winter MET - Middle European MEWT - Middle European Winter SWT - Swedish Winter	+1 hour	1 pm
EET - Eastern European, USSR Zone 1	+2 hours	2 pm
BT - Baghdad, USSR Zone 2	+3 hours	3 pm
ZP4 - USSR Zone 3	+4 hours	4 pm
ZP5 - USSR Zone 4	+5 hours	5 pm
ZP6 - USSR Zone 5	+6 hours	6 pm
WAST - West Australian Standard	+7 hours	7 pm
CCT - China Coast, USSR Zone 7	+8 hours	8 pm
JST - Japan Standard, USSR Zone 8	+9 hours	9 pm
EAST - East Australian Standard GST Guam Standard, USSR Zone 9	+10 hours	10 pm
IDLE - International Date Line NZST - New Zealand Standard NZT - New Zealand	+12 hours	Midnight

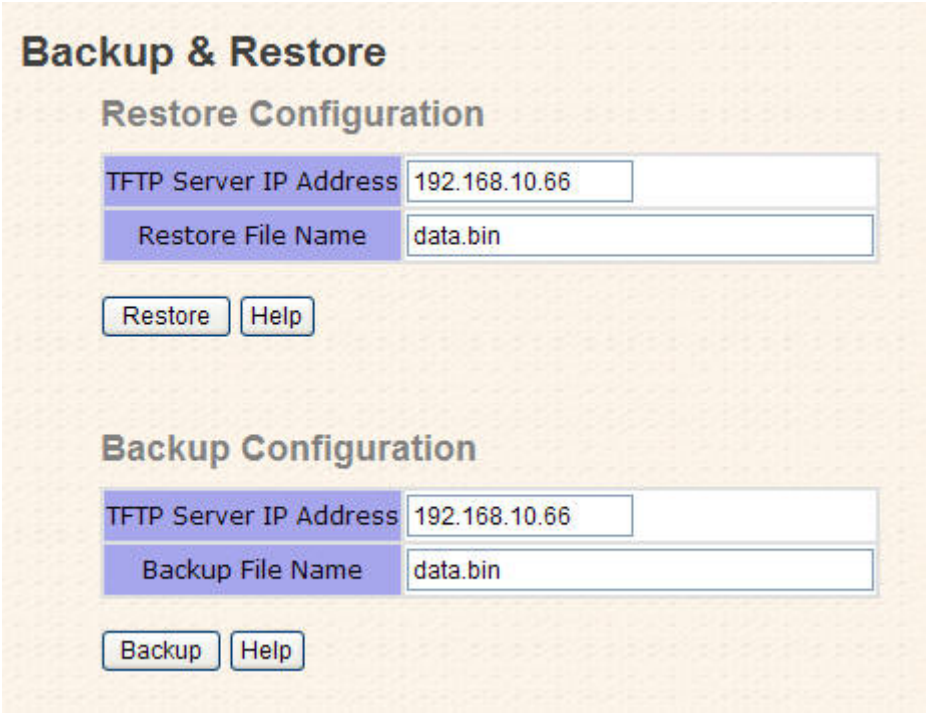
The following table describes the labels in this screen.

Label	Description
SNTP Sever IP Address	Set the SNTP server IP address.
Daylight Saving	Set up the Daylight Saving beginning time and Daylight Saving

Period	ending time. Both will be different each year.
Daylight Saving Offset	Set up the offset time.
Switch Timer	Display the switch current time.
Apply	Click "**Apply**" to set the configurations.

4.1.2.5 Backup & Restore

You can save current EEPROM value from the switch to TFTP server, then go to the TFTP restore configuration page to restore the EEPROM value.



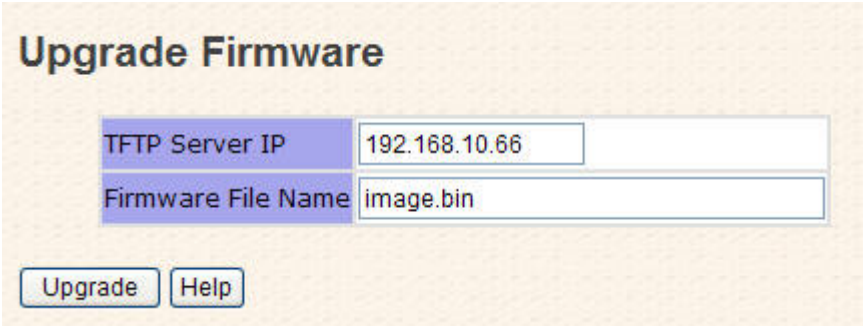
Backup & Restore interface

The following table describes the labels in this screen.

Label	Description
TFTP Server IP Address	Fill in the TFTP server IP
Restore File Name	Fill the file name.
Restore	Click "**restore**" to restore the configurations.
Restore File Name	Fill the file name.
Restore	Click "**restore**" to restore the configurations.
Backup	Click "**backup**" to backup the configurations.

4.1.2.6 Upgrade Firmware

Upgrade Firmware allows you to update the switch firmware. Before updating, make sure you have your TFTP server ready and the firmware image is on the TFTP server.



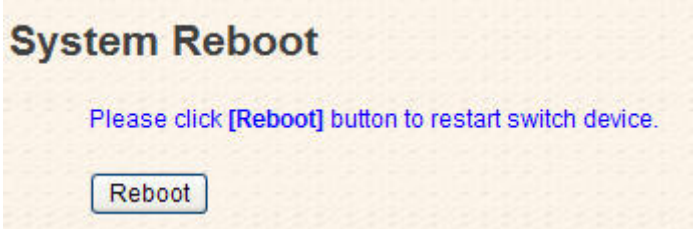
Update Firmware interface

4.1.2.7 Factory Default

Factory Default interface

Reset switch to default configuration. Click Reset to reset all configurations to the default value. You can select "**Keep current IP address setting**" and "**Keep current username & password**" to prevent IP and username and password form default.

4.1.2.8 System Reboot

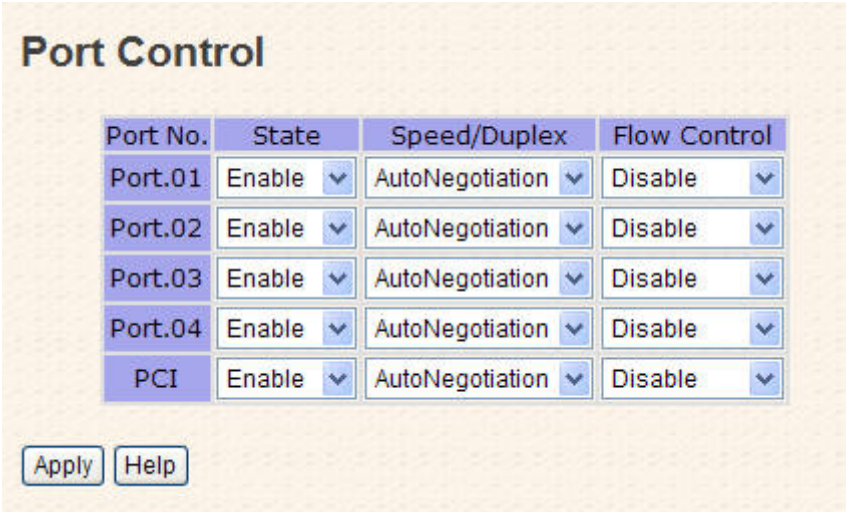


System Reboot interface

4.1.3 Port Configuration

4.1.3.1 Port Control

By this function, you can set the state, speed/duplex, flow control, and security of the port.



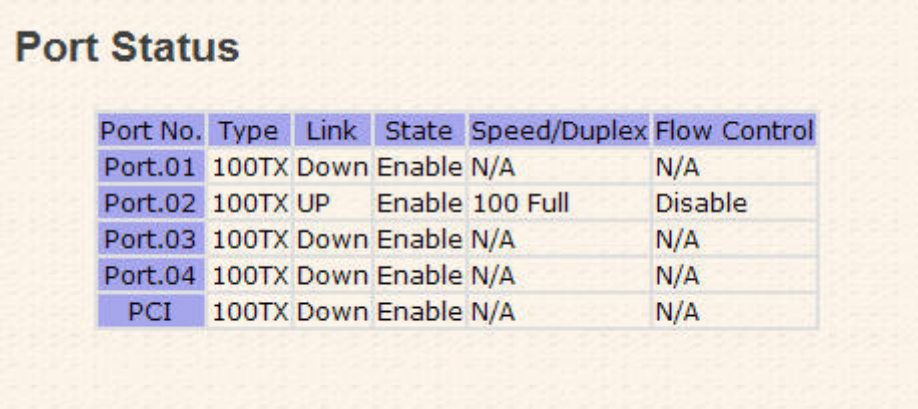
Port Control interface

The following table describes the labels in this screen.

Label	Description
Port NO.	Port number for setting.
State	Enable/Disable the port.
Speed/Duplex	You can set Auto-negotiation, 100 full,100 half,10 full,10 half mode.
Flow Control	Support symmetric and asymmetric mode to avoid packet loss when congestion occurred.
Apply	Click "**Apply**" to set the configurations.

4.1.3.2 Port Status

The following information provides the current port status.

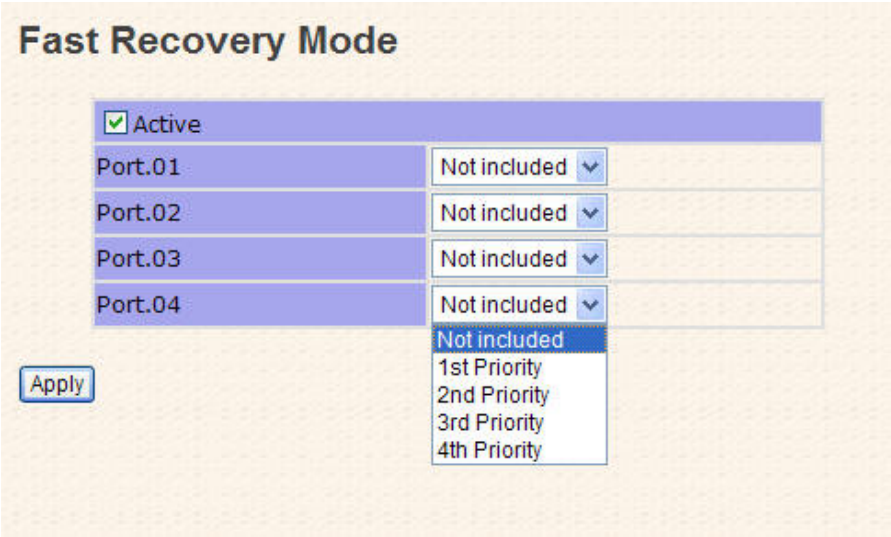

Port Status
Port No. Type Link State Speed/Duplex Flow Control
Port.01 100TX Down Enable N/A N/A
Port.02 100TX UP Enable 100 Full Disable
Port.03 100TX Down Enable N/A N/A
Port.04 100TX Down Enable N/A N/A
PCI 100TX Down Enable N/A N/A

Port Status interface

4.1.4 Redundancy

4.1.4.1 Fast Recovery Mode

The fast Recovery Mode can be set to connect multi ICS-4040 ports to one or more switches. The ICS-4040 with its fast recovery mode will provide redundant links. Fast Recovery mode supports 4 priorities, only the first priority will be the act port, the other ports configured with other priority will be the backup ports.



Fast Recovery Mode interface

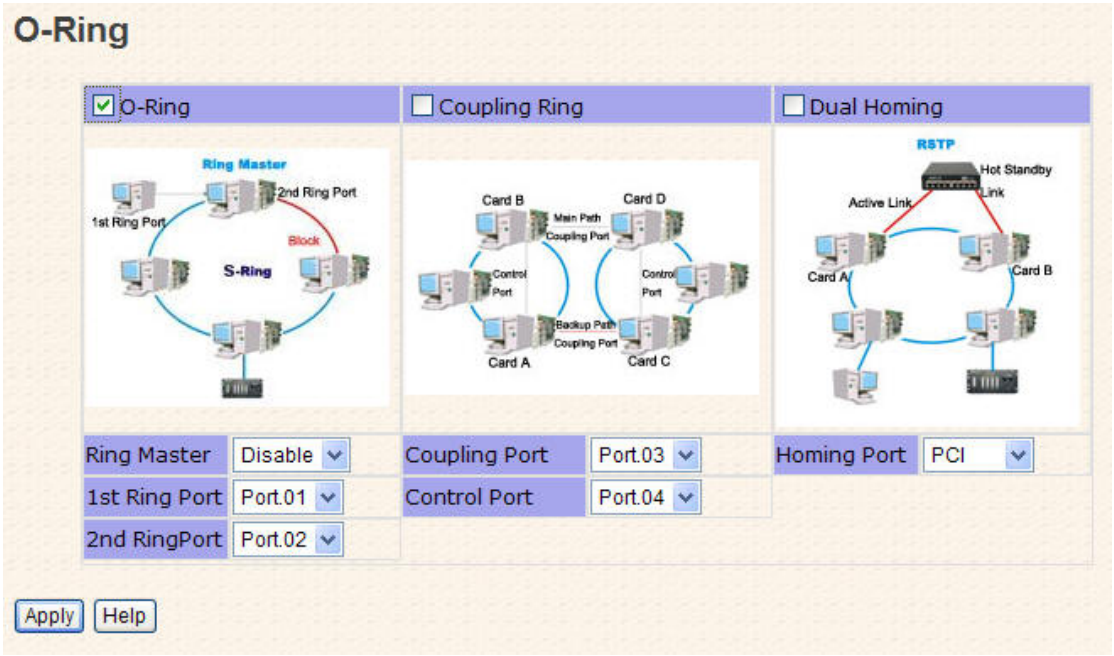
The following table describes the labels in this screen.

Label	Description
Active	Activate the fast recovery mode.
port	Port can be configured as 4 priorities. Only the port with highest priority will be the active port. 1st Priority is the highest.
Apply	Click "**Apply**" to set the configurations.

Note: If you configure redundancy mode by hardware (DIP switch), web UI will not allow you to change mode by WEB.

4.1.4.2 O-Ring

O-Ring is one of the most powerful redundant technology in the world. The recovery time of O-Ring is less than 10 mS. It can reduce unexpected damage cause by network topology change. O-Ring Support 3 Ring topology: O-Ring, Coupling Ring and Dual Homing.



O-Ring interface

The following table describes the labels in this screen.

Label	Description
Ring	Mark to enable Ring.
Ring Master	There should be one and only one Ring Master in a ring. However if there are two or more switches which set Ring Master to enable, the switch with the lowest MAC address

	will be the actual Ring Master and others will be Backup Masters.
1st Ring Port	The primary port, when this switch is Ring Master.
2nd Ring Port	The backup port, when this switch is Ring Master.
Coupling Ring	Mark to enable Coupling Ring. Coupling Ring can be used to divide a big ring into two smaller rings to avoid effecting all switches when network topology change. It is a good application for connecting two Rings.
Coupling Port	Link to Coupling Port of the switch in another ring. Coupling Ring need four switch to build an active and a backup link. Set a port as coupling port. The coupled four ports of four switches will be run at active/backup mode.
Control Port	Link to Control Port of the switch in the same ring. Control Port used to transmit control signals.
Dual Homing	Mark to enable Dual Homing. By selecting Dual Homing mode, Ring will be connected to normal switches through two RSTP links (ex: backbone Switch). The two links work as active/backup mode, and connect each Ring to the normal switches in RSTP mode.
Apply	Click "**Apply**" to set the configurations.

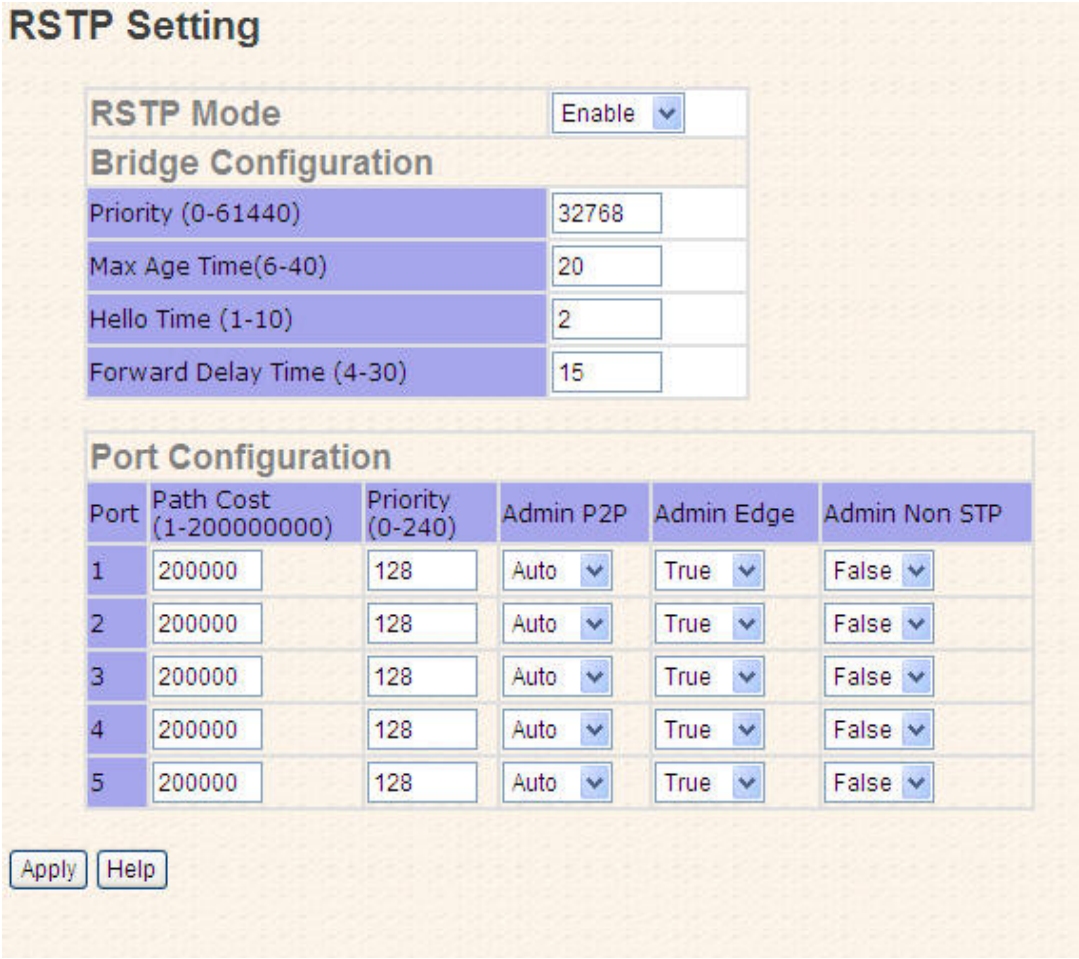
Note: We don't suggest you to set one switch as a Ring Master and a Coupling Ring at the same time due to heavy load.

4.1.4.3 RSTP

The Rapid Spanning Tree Protocol (RSTP) is an evolution of the Spanning Tree Protocol. It provides faster spanning tree convergence after a topology change. The system also supports STP and the system will auto detect the connected device that is running STP or RSTP protocol.

RSTP setting

You can enable/disable RSTP function, and set parameters for each port.



RSTP Setting interface

The following table describes the labels in this screen.

Label	Description
RSTP mode	You must enable or disable RSTP function before configuring the related parameters.
Priority (0-61440)	A value used to identify the root bridge. The bridge with the lowest value has the highest priority and is selected as the root. If the value changes, you must reboot the switch. The value must be multiple of 4096 according to the protocol standard rule.
Max Age (6-40)	The number of seconds a bridge waits without receiving Spanning-tree Protocol configuration messages before attempting a reconfiguration. Enter a value between 6 through 40.
Hello Time (1-10)	The time that controls switch sends out the BPDU packet to check RSTP current status. Enter a value between 1 through 10.
Forwarding Delay Time (4-30)	The number of seconds a port waits before changing from its Rapid Spanning-Tree Protocol learning and listening states to the forwarding state. Enter a value between 4 through 30.
Path Cost (1-200000000)	The cost of the path to the other bridge from this transmitting bridge at the specified port. Enter a number 1 through 200000000.
Priority (0-240)	Decide which port should be blocked by priority in LAN. Enter a number 0 through 240. The value of priority must be the multiple of 16
Admin P2P	Some of the rapid state transactions that are possible within RSTP are dependent upon whether the port concerned can only be connected to exactly one other bridge (i.e. It is served by a point-to-point LAN segment), or it can be connected to two or more bridges (i.e. It is served by a shared medium LAN segment). This function allows the P2P status of the link to be manipulated administratively. True means P2P enabling. False means P2P disabling.
Admin Edge	The port directly connected to end stations, and it cannot create bridging loop in the network. To configure the port as an edge port, set the port to "**True**".

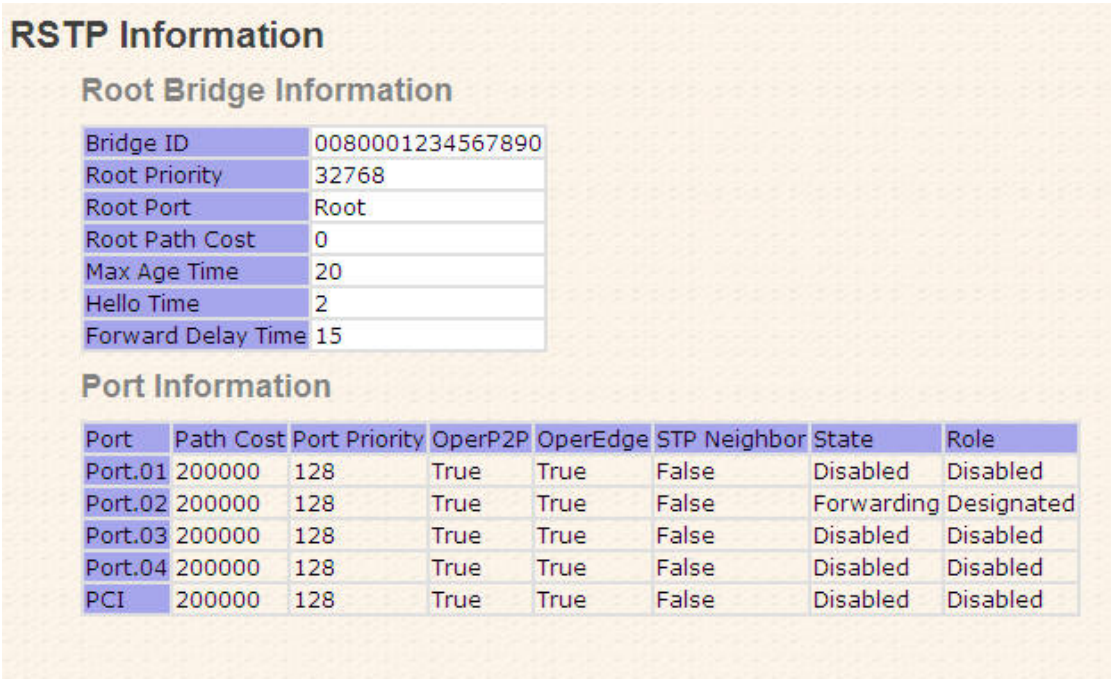
Admin Non STP	The port includes the STP mathematic calculation. **True** is not including STP mathematic calculation. **False** is including the STP mathematic calculation.
Apply	Click "**Apply**" to set the configurations.

NOTE: Follow the rule to configure the MAX Age, Hello Time, and Forward Delay Time.

2 x (Forward Delay Time value –1) > = Max Age value >= 2 x (Hello Time value +1)

RSTP Information

Show RSTP algorithm result at this table.



RSTP Information

Root Bridge Information

Bridge ID	0080001234567890
Root Priority	32768
Root Port	Root
Root Path Cost	0
Max Age Time	20
Hello Time	2
Forward Delay Time	15

Port Information

Port	Path Cost	Port Priority	OperP2P	OperEdge	STP Neighbor	State	Role
Port.01	200000	128	True	True	False	Disabled	Disabled
Port.02	200000	128	True	True	False	Forwarding	Designated
Port.03	200000	128	True	True	False	Disabled	Disabled
Port.04	200000	128	True	True	False	Disabled	Disabled
PCI	200000	128	True	True	False	Disabled	Disabled

RSTP Information interface

4.1.5 SNMP Configuration

Simple Network Management Protocol (SNMP) is the protocol developed to manage nodes (servers, workstations, routers, switches and hubs etc.) on an IP network. SNMP enables network administrators to manage network performance, find and solve network problems, and plan for network growth. Network management systems learn of problems by receiving traps or change notices from network devices implementing SNMP.

4.1.5.1 SNMP –Agent Setting

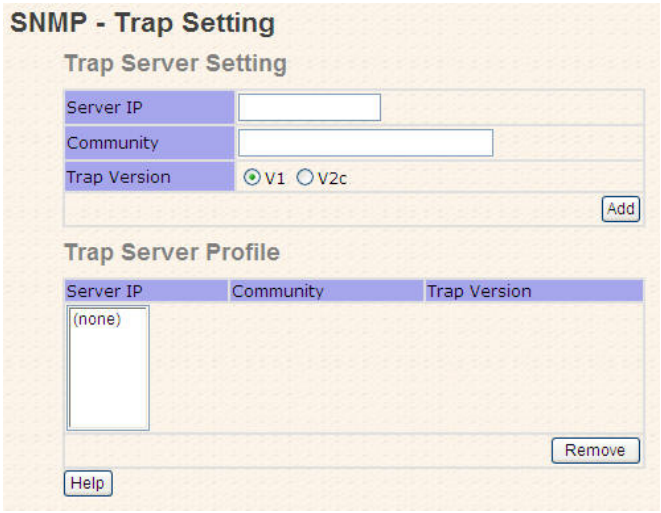
You can set SNMP agent related information by Agent Setting Function.

The following table describes the labels in this screen.

Label	Description
SNMP –Agent Setting	SNMP Community should be set for SNMP. Four sets of "Community String/Privilege" are supported. Each Community String is maximum 32 characters. Keep empty to remove this Community string.

4.1.5.2 SNMP –Trap Setting

A trap manager is a management station that receives traps, the system alerts generated by the switch. If no trap manager is defined, no traps will issue. Create a trap manager by entering the IP address of the station and a community string. To define management stations as trap manager and enter SNMP community strings and selects the SNMP version.



The following table describes the labels in this screen.

Label	Description
Server IP	The server IP address to receive Trap
Community	Community for authentication
Trap Version	Trap Version supports V1 and V2c.
Add	Add trap server profile.
Remove	Remove trap server profile.
Help	Show help file.

4.1.6 VLAN

A Virtual LAN (VLAN) is a logical network grouping that limits the broadcast domain, which allows you to isolate network traffic. Only the members of the VLAN will receive traffic from the same members of VLAN. Basically, creating a VLAN from a switch is logically equivalent of reconnecting a group of network devices to another Layer 2 switch. However, all the network devices are still plugged into the same switch physically.

The switch card supports port-based VLAN only.

4.1.6.1 VLAN Configuration – Port Based

Packets can go among only members of the same VLAN group. Note all unselected ports are treated as belonging to another single VLAN. If the port-based VLAN enabled, the VLAN-tagging is ignored.

VLAN Configuration – Port Based VLAN interface

The following table describes the labels in this screen.

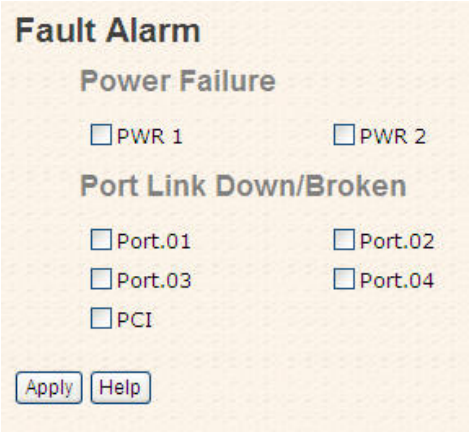
Label	Description
Group	Mark the blank to assign the port into VLAN group.
Apply	Click "**Apply**" to set the configurations.
Help	Show help file.

4.1.7 Warning

Warning function is very important for Ethernet switch. You will be informaed by SYSLOG, and E-MAIL. It helps you to monitor the switch status on remote site. When events occurred, the warning message will send to your appointed server, E-MAIL, or relay fault to switch panel.

4.1.7.1 Fault Alarm

When any selected fault event is happened, the Fault LED in switch panel will light up and the electric relay will signal at the same time.



Fault Alarm interface

The following table describes the labels in this screen.

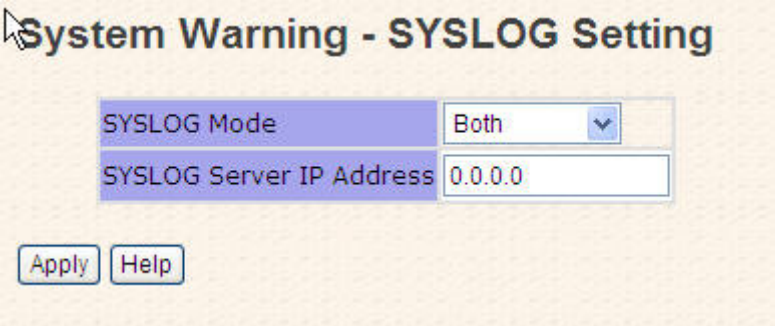
Label	Description
Power Failure	Mark the blank of PWR 1 or PWR 2 to monitor.
Port Link Down/Broken	Mark the blank of port 1 to port 4 to monitor.
Apply	Click "**Apply**" to set the configurations.
Help	Show help file.

4.1.7.2 System Alarm

System alarm support two warning mode: 1. SYSLOG. 2. E-MAIL. You can monitor switch through selected system events.

System Warning – SYSLOG Setting

The SYSLOG is a protocol to transmit event notification messages across networks. Please refer to RFC 3164 - The BSD SYSLOG Protocol



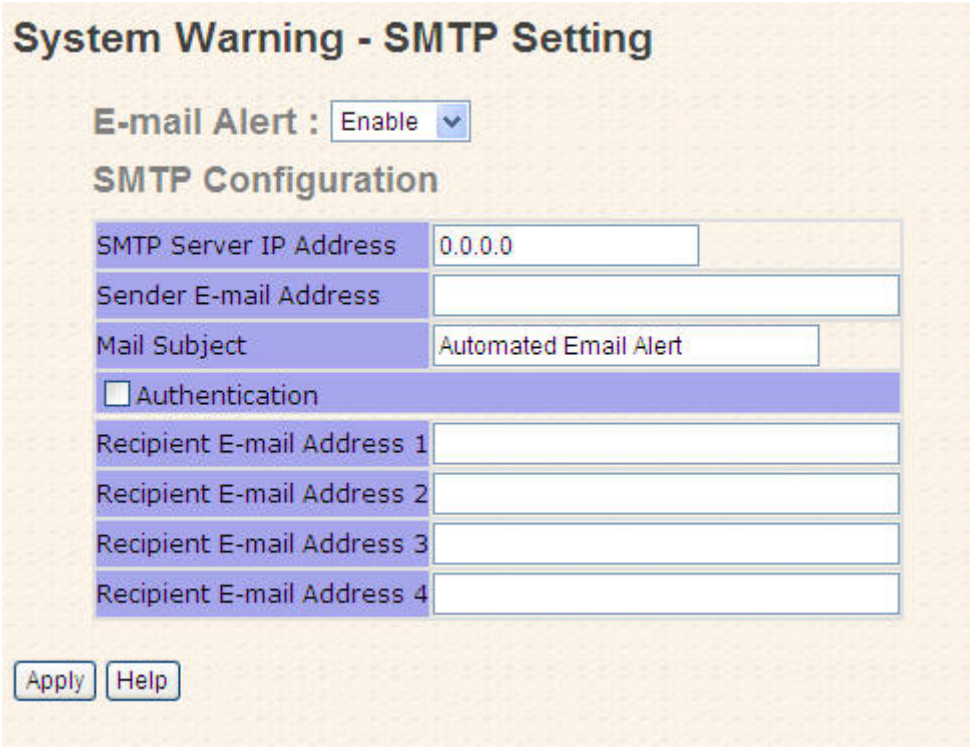
System Warning – SYSLOG Setting interface

The following table describes the labels in this screen.

Label	Description
SYSLOG Mode	■ **Disable:** disable SYSLOG. ■ **Client Only:** log to local system. ■ **Server Only:** log to a remote SYSLOG server. ■ **Both:** log to both of local and remote server.
SYSLOG Server IP Address	The remote SYSLOG Server IP address.
Apply	Click "**Apply**" to set the configurations.
Help	Show help file.

System Warning – SMTP Setting

The SMTP is Short for Simple Mail Transfer Protocol. It is a protocol for e-mail transmission across the Internet. Please refer to RFC 821 - Simple Mail Transfer Protocol.



System Warning – SMTP Setting interface

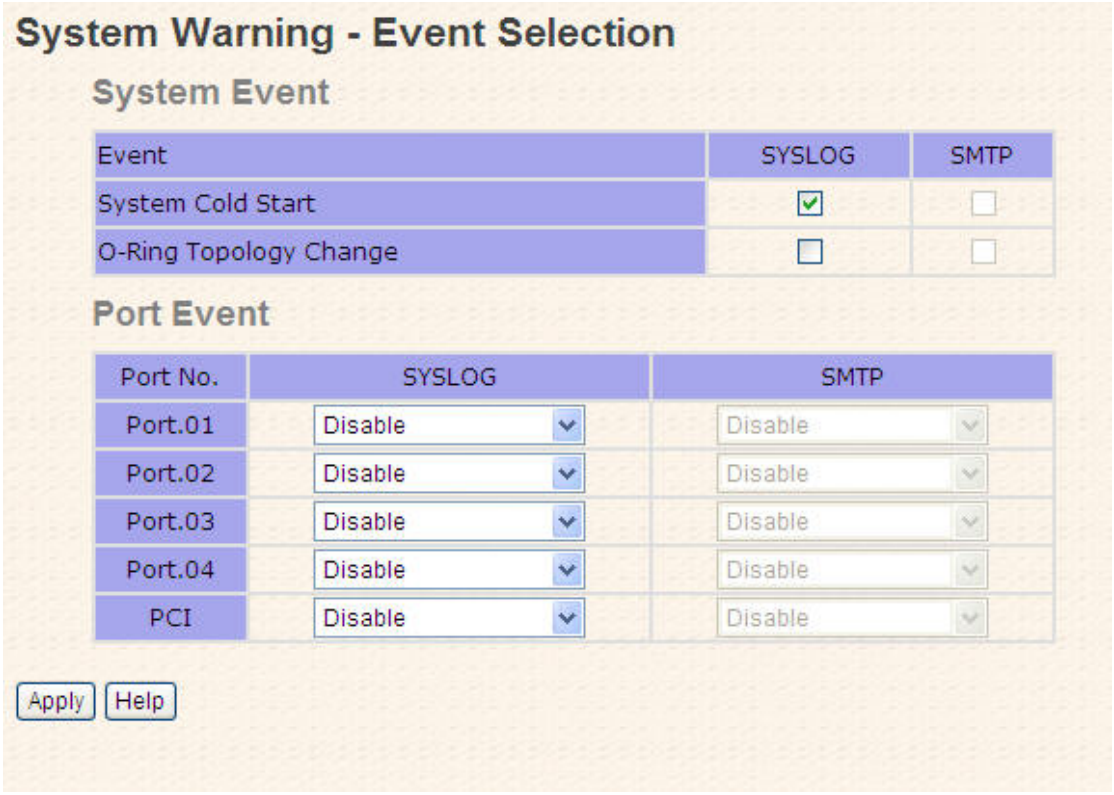
The following table describes the labels in this screen.

Label	Description
E-mail Alarm	Enable/Disable transmission system warning events by e-mail.
Sender E-mail Address	The SMTP server IP address
Mail Subject	The Subject of the mail
Authentication	■ **Username:** the authentication username. ■ **Password:** the authentication password. ■ **Confirm Password:** re-enter password.
Recipient E-mail Address	The recipient's E-mail address. It supports 6 recipients for a mail.
Apply	Click "**Apply**" to set the configurations.
Help	Show help file.

System Warning – Event Selection

SYSLOG and SMTP are the two warning methods that supported by the system. Check the corresponding box to enable system event warning method you wish to

choose. Please note that the checkbox can not be checked when SYSLOG or SMTP is disabled.



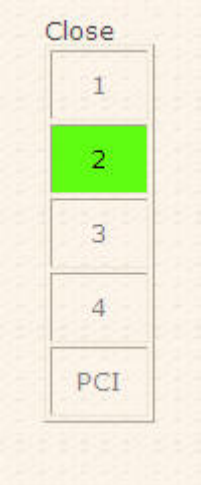
System Warning – Event Selection interface

The following table describes the labels in this screen.

Label	Description
System Event	
System Cold Start	Alert when system restart
Ring Topology Change	Alert when Ring topology changes
Port Event	■ **Disable** ■ **Link Up** ■ **Link Down** ■ **Link Up & Link Down**
Apply	Click "**Apply**" to set the configurations.
Help	Show help file.

4.1.8 Front Panel

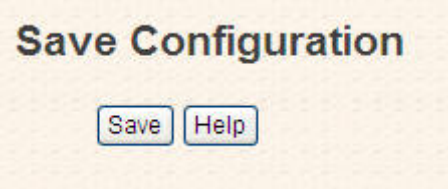
Show ICS-4040 panel. Click Close to close panel on web.



Front Panel interface

4.1.9 Save Configuration

If any configuration changed, "**Save Configuration**" should be clicked to save current configuration data to the permanent flash memory. Otherwise, the current configuration will be lost when power off or system reset.



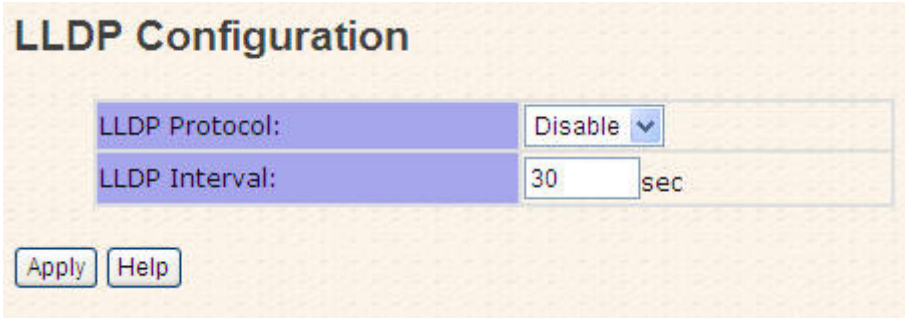
System Configuration interface

The following table describes the labels in this screen.

Label	Description
Save	Save all configurations.
Help	Show help file.

4.1.10 LLDP

LLDP (Link Layer Discovery Protocol) function allows the switch to advertise its information to other nodes on the network and store the information it discovers.



The following table describes the labels in this screen.

Label	Description
LLDP Protocol	"Enable" or "Disable" LLDP function.
LLDP Interval	The interval of resend LLDP (by default at 30 seconds)
Apply	Click "**Apply**" to set the configurations.
Help	Show help file.

Technical Specifications

Technology	
PCI specification	Meets PCI Local Bus specification, Rev 2.2 PCI 32-bit Bus Master architecture
Wake On LAN	Supports Wake On LAN (WOL) through PCI bus
Ring redundancy	■ **RSTP** ■ **O-Ring** ■ **Couple Ring** ■ **Dual Homing** ■ **Fast recovery mode**
Driver Support	■ **Microsoft WFW 3.11, Windows**

	■ **WIN95/NT/98/2000/Me/XP/2003/Vista** ■ **Novel NetWare 3. and above** ■ **Linux 2.4.x/2.6.x** ■ **WINCE 4.0/5.0**
Ethernet Standards	IEEE802.3 10BASE-T IEEE802.3u 100BASE-TX IEEE802.3x Flow Control and Back pressure IEEE802.1D Spanning tree protocol IEEE802.1w Rapid Spanning tree protocol
MAC addresses	1024
Flow Control	IEEE 802.3x Flow Control and Back-pressure
VLAN	Port based
Processing	Store-and-Forward
Firmware upgrade	TFTP
Interface	
RJ45 Ports	4 x 10/100Base-T(X), Auto MDI/MDI-X
LED Indicators	Per Unit : Power (Green/Red) RJ45 Ports: Per Port : Link/Activity(Green/Blinking Green), Ring Port (Amber)
Power Requirements	
Power Input Voltage	PCI Power: + 5V DC on PCI bus External Power: +9 ~ 30V DC in Terminal block
Reverse Polarity Protection	Present
Power Consumption	3.5 Watts Max
Environmental	
Operating Temperature	-10 to 60°C
Operating Humidity	5% to 95%, non-condensing
Mechanical	
Dimensions(W x D x H)	124mm(W) x 100mm(D)
Regulatory Approvals	
EMI	FCC Part 15, CISPER (EN55022) class A
EMS	EN61000-4-2 (ESD), EN61000-4-3 (RS), EN61000-4-4 (EFT), EN61000-4-5 (Surge), EN61000-4-6 (CS)
Shock	IEC60068-2-27

Free Fall	IEC60068-2-32
Vibration	IEC60068-2-6
Warranty	3 years